BRIEF DESCRIPTION OF THE DRAWINGS

[0026] Figs. 1(a) and 1(b) are schematics illustrating an exemplary embodiment of an optical transceiver according to the present invention;

[0027] Figs. 2(a) and 2(b) are schematics illustrating an optical socket part having two sets of terminals;

[0028] Fig. 3 is a schematic illustrating the connection condition between an optical socket and an optical plug;

[0029] Fig. 4 is a schematic illustrating an optical socket part having a set of terminals;

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[0030] Figs. ~~5(a) to 5(c)~~ 5(a), 5(b), 5(c), 5(d) and 5(e) are schematics illustrating a manufacturing process of an optical transceiver;

[0031] Figs. 6(a) and 6(b) are schematics illustrating an adjustment of the disposition position of an optical socket in a manufacturing process of an optical transceiver;

[0032] Fig. 7 is a schematic illustrating an example of forming a wiring pattern on a substrate;

[0033] Fig. 8 is a schematic illustrating an example of mounting an optical socket on a substrate;

[0034] Fig. 9 is a schematic illustrating an example of an optical head;

[0035] Fig. 10 is a schematic illustrating an example of an image read by an image pick-up element;

[0036] Fig. 11 is a schematic illustrating another constitution example (a columnar body) of the ferrule of the optical head;

[0037] Fig. 12 is a schematic illustrating still another constitution example (of a lens built-in type) of the ferrule of the optical head;

[0038] Fig. 13 is a schematic illustrating yet another constitution example (using an optical fiber) of the ferrule of the optical head;

[0039] Figs. 14(a) and 14(b) are schematics illustrating an example of forming a lens by putting a mold into a fitting hole of the optical socket;

[0040] Figs. 15(a) and 15(b) are schematics illustrating an example of forming a mounting projection and a mounting hole in a substrate and an optical socket, respectively;

[0041] Fig. 16 is a schematic illustrating an example of forming a mounting hole in a substrate;

[0042] Fig. 17 is a schematic illustrating an exemplary embodiment using a lens built-in type optical socket;

[0043] Fig. 18 is a schematic illustrating an exemplary embodiment using a lens built-in type optical socket;

[0044] Fig. 19 is a schematic illustrating an example of an optical transceiver according to a comparative example;

[0045] Fig. 20 is a schematic illustrating an example of an optical connector of according to a comparative example;

[0046] Fig. 21 is a schematic illustrating the constitution of an optical transceiver according to a second exemplary embodiment;

[0047] Fig. 22 is a schematic illustrating another constitution of the optical transceiver according to the second exemplary embodiment;

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[0048] Figs. ~~23(a) – 23(f)~~ 23(a), 23(b), 23(c), 23(d), 23(e) and 23(f) are schematics illustrating a manufacturing process of the optical transceiver according to the second exemplary embodiment;

[0049] Fig. 24 is a schematic illustrating a constitution example of an optical head;

[0050] Fig. 25 is a schematic illustrating an example of a captured image;

[0051] Fig. 26 is a schematic illustrating a constitution example of a lens for adjusting an image-formation position of an image of an alignment mark;

[0052] Fig. 27 is a schematic illustrating a constitution example of a lens for adjusting an image-formation position of an image of an alignment mark.

DETAILED DESCRIPTION OF PREFERRED EXEMPLARY EMBODIMENTS

[0053] Exemplary embodiments of the present invention are described below with reference to the drawings.

<First Exemplary Embodiment>

[0054] Figs. 1(a) and 1(b) show a constitution example of an optical transceiver. Fig. 1(a) is a cross-sectional view showing the internal disposition by cutting horizontally the optical transceiver 1, and Fig. 1(b) is a cross-sectional view taken along plane I-I' in Fig. 1(a).

[0055] As shown in Figs. 1(a) and 1(b), a signal processing circuit board 12 and an optical coupling unit 13 are disposed in a housing 11 of the optical transceiver 1. The signal processing circuit board 12 is provided with a parallel-serial signal conversion circuit 121, a drive circuit 122, a serial-parallel signal conversion circuit 123, an amplification circuit 124, a lead frame 125, etc. The parallel-serial signal conversion circuit 121 converts a parallel signal, provided from the outside, into a serial signal. The drive circuit 122 changes the serial signal to a drive signal of a light-emitting element 133. The amplification circuit 124 performs a waveform shaping and a level amplification for received light signal of a light-receiving element 134. The serial-parallel signal conversion circuit 123 converts the